T-BERD®/MTS-4000 Multiple Services Test Platform

Enterprise Services Application Module (ESAM)

Key Features

- Provides Layer 1-7 protocol capture and expert analysis
- Offers wirespeed deep packet statistics and analysis
- Tests network connectivity
- Performs network discovery
- Conducts a full range of physical media tests
- Offers a workflow-based user interface
- A modular platform with many options:
  - VoIP phone emulation
  - Optical Power Meter/Visual Fault Locator
  - Fiber inspection probe with automated pass/fail
  - WiFi testing
  - OTDR modules

Applications

- Perform all-in-one enterprise testing: verify that copper cables support gigabit Ethernet, test network connectivity (from Ethernet interface discovery to Layer 4 Port connectivity), discover network devices both on and off the subnet, collect statistics and analyze network utilization/traffic patterns, and perform wirespeed capture on gigabit Ethernet links
- Speed certify electrical Ethernet up to 1000BASE-T
- Isolate and resolve Ethernet or IP problems in the field using unique, in-depth JDSU J-Mentor capture and decode capabilities

Today's Information technology (IT) networks are more complex than ever with Voice over Internet Protocol (IP), IP security cameras, presence, and remote applications being run over high-speed copper, fiber and wireless infrastructure. Complexity that was once confined to the data center is now finding its way closer and closer to the user causing the front-line IT technician to need to resolve a far greater range of faults than ever before. With even minor network faults having the potential to render employees unproductive, keeping the network up is now a mission-critical task. The ESAM addresses these challenges of modern networks with a modern approach.

Through its workflow-based intuitive user interface the ESAM provides physical media tests including speed-certification of electrical Ethernet cabling, network connectivity tests, discovery, wire-speed deep-packet statistics, and wire-speed protocol capture and expert analysis using unique, in-depth JDSU J-Mentor capabilities. In addition, the ESAM is part of the modular JDSU T-BERD/MTS-4000 platform allowing additional options that include VoIP emulation, WiFi testing, IP video testing, Optical Power Meters, Visual Fault Locators, digital fiber inspection probes, and OTDRs.

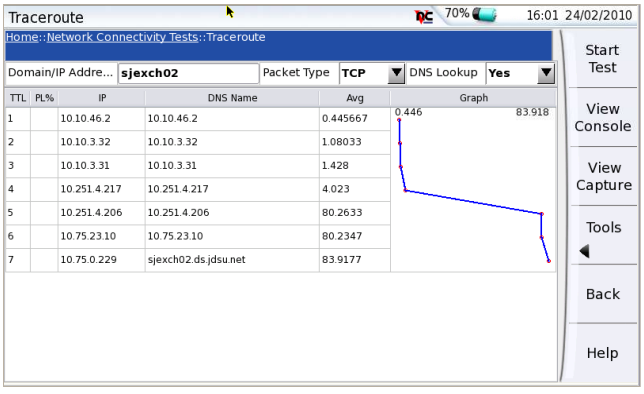
Test connectivity is obtained either electrically via a 10/100/1000 RJ-45 Ethernet jack or via an SFP for optical Ethernet.

Physical Media Tests

All the features of the JDSU Validator Ethernet speed certifier are included in the ESAM. Technicians can use the included Plan-Um software to create cabling layout diagrams and cable test schedules. After loading the job onto the ESAM, the technician can run auto-tests for wiremap, length, signal-to-noise ratio, skew, and bit error rate tests. Passing these tests ensures that the cable can support 1000BASE-T. All of the auto tests can also be performed manually as can tone generation and ID-only mapping.

Network Connectivity Tests

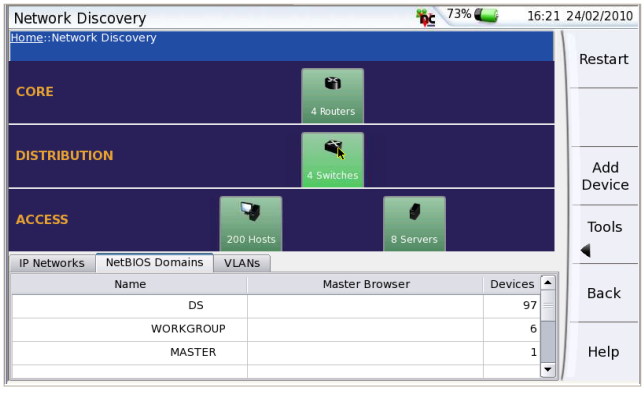
Once the physical media has been tested and confirmed to support Ethernet, the technician can test for connectivity to active Ethernet devices on a single drop. If Power over Ethernet (PoE) is supplied, the pins, voltage, and current can be checked to ensure it matches the requirements of the powered device. Port discovery will confirm that the Ethernet interface is advertising the correct speed and duplex options, avoiding optional duplex-mismatch issues. The next connectivity test will attempt to obtain an IP address using Dynamic Host Configuration Protocol (DHCP) (static configuration is also possible). Duplicate IP addresses will be flagged to the user's attention. Once an IP configuration is obtained, the ESAM can perform Ping, TraceRoute, and Domain Name System (DNS) connectivity tests to ensure connectivity to various network devices. Firewalls can also be tested by Transmission Control Protocol (TCP)/User Datagram Protocol (UDP) connectivity tests to verify that particular TCP/UDP ports are open or blocked. If Cisco Discovery Protocol (CDP) and/or Link Layer Discovery Protocol (LLDP) are used in the network, the analyzer can read these messages and report them to the user. If issues are observed during many of the connectivity tests, the technician can chose to view a capture of all frames sent and received for that specific test allowing in-depth root-cause analysis.



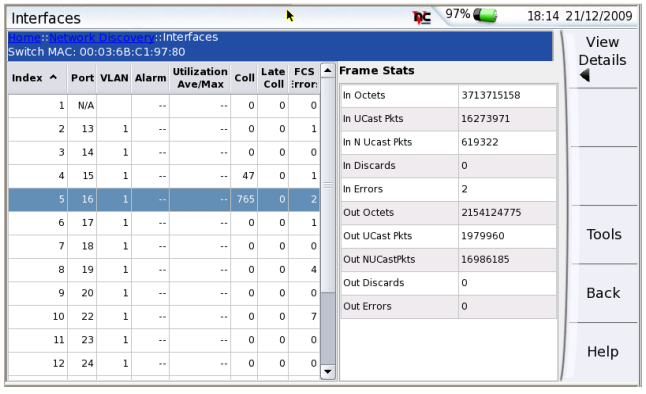
Network Discovery

Once the technician has confirmed basic connectivity to the network, they may have the need to discover what devices are on the network. Using active and passive discovery methods from an individual Ethernet drop, the technician can discovery a wide range of devices both within the users subnetwork and beyond. Presented with a graphical view of the discovered devices, the technician can drill into details about specific network elements. By configuring Simple Network Management Protocol (SNMP) password strings, network devices can be queried and the various details can be viewed by the technician. Any obvious problems in the network will be highlighted to the user.

Once the user drills into details about a specific element they can view details such as MAC/IP addresses. If SNMP is enabled on the network additional information such as interface utilization, packet rates, and errors can be viewed.



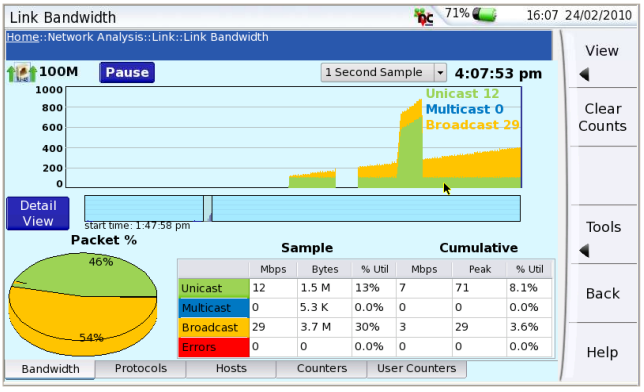
Graphic view of discovered devices



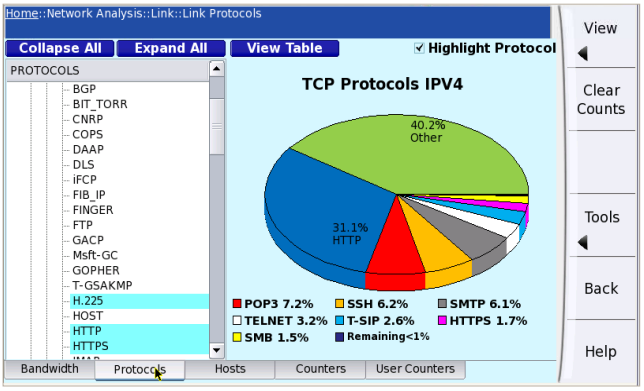
MAC/IP adddress details

Network Statistics

By connecting to an Ethernet aggregating Test Access Port (TAP) or switch mirror port, the analyzer can gather statistics at full line speed. Utilization statistics can be viewed by link, VLAN, and Subnetwork. Link utilization can be viewed and broken down by unicast, broadcast, multicast, and errored frames. Protocol distribution on the link can be viewed allowing to user to identify what protocols are consuming link capacity. Top-talkers on the link will be identified to the user. Pre-defined and user-defined wire-speed packet/byte counters allow the user to view statistics by specific protocols and events.



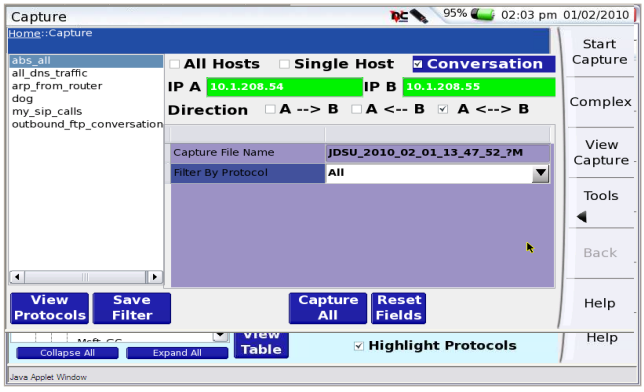
Utilization statistic view



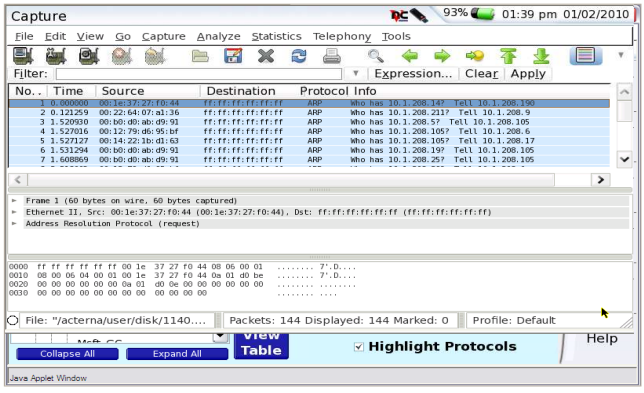
Example of TCP Protocols

Packet Capture and Expert Analysis

Hardware-based packet capture ensures that all frames are captured – even at sustained full gigabit line rate. The 1 Gigabyte capture buffer allows for a large amount of data to be captured. Captured traffic is stored in packet capture (PCAP) format and can be analyzed with Wireshark – both on and off the tester. Pre-capture filters and triggers can be applied to ensure that the correct frames are captured at the correct time. Expert analysis via J-Mentor reduces the need to be an expert in analyzing captured data.



Capture and filter all frames with the ESAM



Captured traffic filters

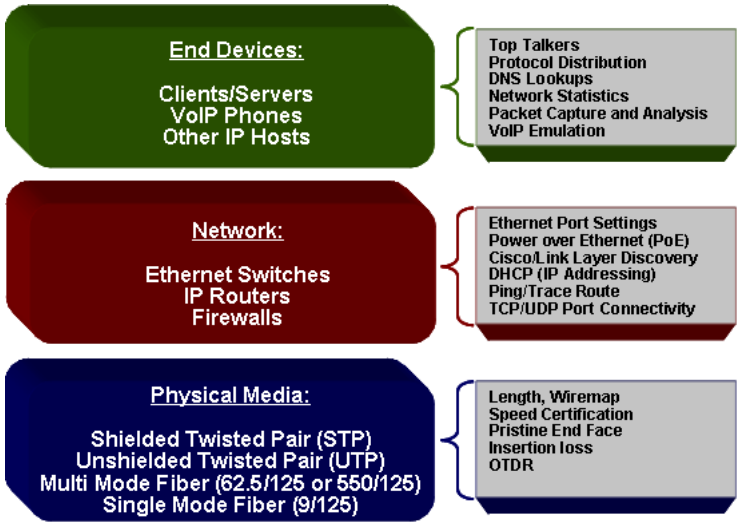
Complete Enterprise Test Solution

When troubleshooting Enterprise IT networks, technicians must perform a variety of tasks. In addition to the wide-ranging standard ESAM functionality, the T-BERD/MTS-4000 meets advanced test needs for optical and Voice over IP (VoIP) network testing.

The T-BERD/MTS-4000 base unit has optional built-in basic fiber optic test options for quick and easy verification of fiber links:

- Power level measurement: The broadband power meter lets technicians easily verify the presence of a signal. This meter covers 850 to 1550 nm over a range of +10 to 60 dBm.
- Visual fault location (VFL): The VFL enables easy and visual break localization and network connectivity check.
- Optical connector inspection via Universal Serial Bus (USB) interface: The optional Inspect Before You Connect fiber inspection probe enables quick and easy control of connector end faces.

The T-BERD/MTS-4000 base unit has optional Voice over IP test capabilities. By emulating a VoIP phone, the T-BERD/MTS-4000 assesses VoIP packet quality and voice quality rating using Mean opinion score (MOS) and R-Factor. VoIP signaling protocols from H.323 (fast or slow), Session Initiation Protocol (SIP), Media Gateway Control Protocol (MGCP), Skinny Cisco Client Protocol (SCCP), Nortel Unistim are all supported



More than a Test Unit

The T-BERD/MTS-4000 platform comes with unprecedented connectivity features such as Ethernet, WiFi, Bluetooth, and on-board Web browser.

Combining these features with an ergonomic and intuitive user interface, the T-BERD/MTS-4000 offers user-friendly functions such as intranet/Internet access, wireless data transfer, and remote operations.

Remote Access 1

Control the T-BERD/MTS-4000 via Internet/intranet and WiFi

- Operate the unit from a computer
- Remote assistance from any expert user

Data Transfer via WiFi/Bluetooth, Ethernet or USB 2

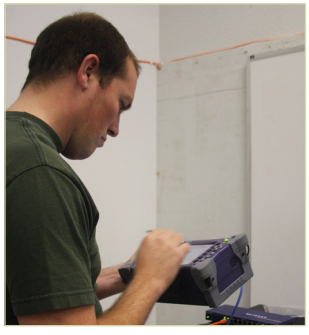
Transfer data easily with a computer or personal digital assistant (PDA)

- Download capture files through the FTP server within the unit
- Send measurement results via e-mail

User-friendly Functions 3

On-board Web browser and HTML/XML/TXT/PDF reader

- Save results with test record information in HTML, XML, TXT or PDF
- Download files from the Web and consult documents, such as the T-BERD/MTS-4000 User's Manual or Quick Guide.



Specifications

T-BERD/MTS-4000 Base Unit Technical Specifications (Typical 25°C)

Display

Touchscreen,TFT color, 7-in, LCD 800 x 480, high visibility for outdoors

Storage and I/O Interfaces

Internal memory 32MB

Extended memory (optional)	Minimum 1 GB (optional)
2x USB2.0, 1x RJ45 Ethernet (up to 1 Gb/s)	
WiFi	Standard IEEE 802.11 b/g
Bluetooth	Class 2, up to 10 m range
Audio interface	2.5 mm jack connector
Ethernet	10/100/1000 MHz full-half duplex

Power Supply

Battery type	Standard removable Li-Ion batteries
AC/DC adapter	Input 100-250 V, 50-60 Hz
Output	12-15V DC/3.7 A
Electrical safety	EN 60950 Compliant

Size and Weight

ESAM Module and battery (W x H x D)	260 x 135 x 90 mm 10.2"L x 5.3"W x 3.5"H
Mainframe with ESAM (with battery)	2.35 kg (4.3 lb)

Environmental Specifications

Operating temperature range	–20 to +50°C
Operating temperature range (all options)	0 to +40°C (32 to 104°F)
Storage temperature range	–20 to +60°C (–4 to 140°F)
Humidity, non-condensing	90%

Base Unit Optical Interfaces (optional)

Power Meter

Power level	+10 to –60 dBm
Calibrated wavelengths	850, 1310, and 1550 nm
Connector type	Universal push/pull (UPP)

Visual Fault Locator (VFL) (optional)

Wavelength	635 nm ±15 nm
Output power level	<1 mW
Laser safety	Class 2 laser
Connector type	Universal push/pull (UPP)

Quick Capture Probe Kit (via USB) (optional)

Magnification	200X and 400X
Interface	through the USB port
Tips	FC, SC, LC, U25, U12

Enterprise Services Application Module Technical Specifications

Power consumption with ESAM	22 Watts maximum
Cooling with ESAM	3 internal temperature-controlled low-noise fans
Battery Life with ESAM	Approximately 2.0 hours w/Base Unit Li-ion (9-Cell)

Test Ports

RJ-45 for cable test
10BASE-T, 100BASE-TX, 1000BASE-T for Network tests
SFP cage
For SFP modules (1000BASE-SX standard, other optional SPFs available)

LEDs	RJ-45 Link and Activity LEDs

Memory

Capture Buffer	1 Gigabyte
Application	128 Megabyte
Flash	16 Megabyte

Cable Tests

Wiremap
Open Pair
Split Pair
Shorted Pair
Pair Length
Distance to Short
Distance to Open
Pair Skew
Pair SNR
BERT
Tone Generator
Flash link light
Detect Power over Ethernet

Cable Test Planning

Interoperable with (included) Plan-Um cable planning software

Cable Types

Shielded or unshielded twisted pair network cable

Cable Length

100 meters (1,500 feet)

Cable Length Accuracy

±5% (after performing both unit and cable calibration)

Split Pair Test – Maximum Cable Length

Up to 100 meters (327 ft), depending upon cable type

Network Connectivity Tools

Discover Network Interface Capabilities
DHCP
DNS
Ping
Traceroute
LLDP Discovery
CDP Discovery
Port Scan up to 100 simultaneous Layer 4 ports

Network Discovery

Discover up to 2000 devices - on and off the subnetwork
Discover IP networks, NetBIOS domains and VLANS
Detailed device information via SNMP (versions 1, 2c and 3)

Network Statistics

Link utilization statistics (broadcast, unicast, multicast, errored) for up to 8hours
Discover and track link protocols – 300 protocols supported
Discover link top talkers – displays top 15 hosts
30 built-in link wirespeed packets counters
10 user concurrent link wirespeed packet counters
Perform deep packet inspection of packet payloads at wirespeed IPV4 and IPV6 support
Subnet utilization statistics on 4 subnets for up to 8 hours
VLAN utilization on 8 VLANs for up to 8 hours

Packet Capture

Capture 1GB of packet data
Pre-capture filters by protocol, IP address or advanced filters
Creates PCAP files for inspection with Wireshark
Perform network analysis using J-Mentor intelligent analysis tool

Ordering Information

North America Packages

TB4-DIS-LAN	ESAM WITH T-BERD 4000 BASE
TB4-DIS-LANVOIPWLAN	ESAM WITH T-BERD 4000 BASE with VoIP and WLAN
TB4000-GOVT-LAN	ESAM WITH T-BERD 4000 BASE, VoIP CISCO & UNISTIM Call Mgr SW
TB4-DIS-LANOPMVFL	ESAM WITH T-BERD 4000 BASE with OPM, VFL & SCOPE
TB4-DIS-LANPKG	ESAM WITH T-BERD 4000 BASE VOIP, WLAN, OPM, VFL, SCOPE

EMEA, UK, LAM, AsiaPac Packages

MTS4-DIS-LAN	ESAM WITH MTS 4000 BASE - UK & EMEA, LA, ASIAPAC POWER SUPPLIES
MTS4-DIS-LANVOIPWLAN	ESAM WITH MTS 4000 BASE with VoIP and WLAN - UK & EMEA, LA, ASIAPAC POWER SUPPLIES
MTS4-DIS-LANOPMVFL	ESAM WITH MTS 4000 BASE with OPM, VFL & SCOPE - UK, EMEA, LA, ASIAPAC POWER SUPPLIES
MTS4-DIS-LANPKG	ESAM WITH MTS 4000 BASE VOIP, WLAN, OPM, VFL, SCOPE - UK, EMEA, LA, ASIAPAC POWER SUPPLIES

Australia Packages

MTS4-DIS-LAN-AU	ESAM WITH MTS 4000 BASE - AU POWER SUPPLY
MTS4-DIS-AU-LANVOIPWLAN	ESAM WITH MTS 4000 BASE with VoIP and WLAN - AU POWER SUPPLY
MTS4-DIS-AU-LANOPMVFL	ESAM WITH MTS 4000 BASE with OPM, VFL & SCOPE - AU POWER SUPPLY
MTS4-DIS-AU-LANPKG	ESAM WITH MTS 4000 BASE VOIP, WLAN, OPM, VFL, SCOPE - AU POWER SUPPLY

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